

THE LIFE HISTORY OF STRYMON CECROPS FABRICIUS (LEPIDOPTERA, LYCAENIDAE).

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While *Strymon cecrops* has been known since 1793 almost nothing has been published of its early stages and life history (1). Based on the deduction that *S. cecrops* is the "least" of the three "purple hair-streak" butterflies in Abbot's notes Scudder (1) cites that he raised it from a larva found on a species of *Vaccinium*. There is no entry for the species in Henry Edwards' Bibliographical Catalogue of the Described Transformations of North American Lepidoptera (2) or in the supplements thereto by Davenport and Dethier (3) and Dethier (4).

In his Butterflies of New Jersey (5) W. P. Comstock includes the species in the "Supplemental List" as an occasional visitor, citing a single incomplete record. In September, 1947, however, we captured two specimens on willow-herb (probably *Epilobium hirsutum* L.) growing at the margin of a rose-mallow swamp near Reed's Beach, Cape May County, N. J. and the following year some thirty-five to forty were observed (6). On August 26, 1950 the locality was again visited. *S. cecrops* was in abundance, about fifty specimens being taken in a single afternoon, notwithstanding considerable wariness on the part of the insects to approach within netting distance.

Careful observations were made with a view to the determination of the food plant. The overwhelming frequency of association of both sexes of *S. cecrops* with the mountain or dwarf sumac (*Rhus copallina* L.) in contrast to the other flora suggested it as the most likely. While the butterflies at times were on the flowers of the plant more often they were hidden among the foliage until startled by our close approach or by light tapping of the bush. Captured females were placed in paper bags together with cuttings from the sumac for transportation home.

One female had already laid eggs on the plant material at the time of transfer to a breeding chamber. The technique employed to induce oviposition in captivity was that of F. Richard as translated by C. L. Remington (7). The confined females lived from 12 to 23 days and laid an average of 20 to 30 eggs. We do not know, however, how long since they had emerged from pupae and how many ova had been laid before capture. Actual oviposition was not observed but they were laid singly, chiefly underneath the

tips of the younger leaflets of the sumac, some on the unopened buds of the flowers. Other plants conspicuous in the natural habitat of the butterfly were ignored by the gravid females and subsequently also by the newly-hatched larvae. Those tested were swamp rose-mallow (*Hibiscus Moscheutos* L.), bayberry (*Myrica pensylvanica* Loisel.) and sassafras (*Sassafras variifolium* Salisb.).

Some newly-hatched larvae fed for a time on unopened flower buds but the majority chose the leaves. Until the third instar they consumed only the under surface. Thereafter, in some cases, holes were formed and enlarged but in others the larvae continued to feed to maturity as before. A negative phototropic tendency was evidenced by their efforts to retreat from strong light as well as their preference to consume the upper surfaces of leaflets turned over, or covered by another. The larvae were normally very sedentary except prior to ecdysis and in their search for a suitable location for pupation. When disturbed during the first three instars they would curl into a ball, losing their grip on the food plant, and remain motionless in that position for fifteen seconds or longer. If they produced any silken threads such did not function to suspend them. Thin strands of silk were seen adhering to the container during the prepupal stage. We were surprised to observe that of three larvae reared individually in Petri dishes all cast skins of one were recovered and of the other two only the skin from the first instar which might very easily have been overlooked was not found. No attempt had been made to remove the castings before they could be consumed. It seems evident, at least under artificial conditions, that the larvae have no interest in eating them. The newly-hatched caterpillars had consumed hardly more than the upper quarter of the egg-shell. The duration of the larval stage was approximately 38-42 days.

Pupation took place against the surfaces of the leaflets of the food plant or container by loose attachment consisting of about twenty very fine silken threads on each side running from the area just dorsad of the edge of the wing cases. Most of the threads fan out slightly from the point attached to the pupa but marked uniformity in this respect is lacking and the general impression is of a rather haphazard or irregular construction. There is only the slightest trace of a silken bed beneath and no defined girdle on the thorax. There is, however, a reasonably well secured silk pad into which the cremaster is embedded.

As most of the larvae pupated between the 6th and 18th of October it was not anticipated that they would emerge until the fol-

lowing spring. After 16 to 17 days at room temperature, however, they began to appear until the pupae were placed under refrigeration. A single specimen removed from refrigeration in December came out a week later. Another individual kept outdoors in an unheated garage emerged in November. The relatively rapid development from egg to pupa and from pupa to imago especially, leads us to the belief that the generation of which our material was a part would surely emerge before mid-August even under natural conditions. In all probability the species will prove to be double brooded in New Jersey as it is in its normal known range considerably to the south. Perhaps there are several broods or overlapping broods in some parts. Comstock's single citation in New Jersey (5) is June 29th. This date would be embraced in the indicated spring or early summer brood. We have not had the opportunity of visiting the relatively recently discovered Reed's Beach *S. cecrops* colony when this earlier brood would be expected to be on the wing. It seems most certain that the butterfly passes the winter as a pupa in this northern portion of its range. Together with our previous experiences (6) the results of the 1950 visit indicates that the butterfly is a resident of the southern part of New Jersey and that dwarf sumac is the food plant in this locality.

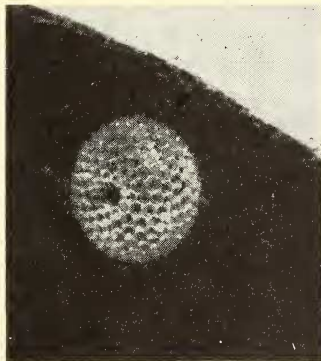


FIG. 1. Egg of *Strymon cecrops* Fabr. (45×).

DESCRIPTIONS OF IMMATURE STAGES

Egg.

Pearly white changing to pale brown before hatching. Echinoid, height less than $\frac{2}{3}$ of width, flattened ventrally. Micropyle relatively small, depressed. Cells over the surface mostly uniform in size, hexagonal. Each side of the hexagon is connected to the

depressed floor of the cell by two surfaces inclined inwardly forming a smaller duodecagon of slightly concave sides at the base. The cell floor is punctuated with a dozen or more pores. Spiculiferous processes arise from the angles of the hexagon. The regularity of features produces a remarkable geometric pattern. Diameter approximately 0.33 mm. (Fig. 1). The larvae emerge in 7-8 days.

Larva.

First instar: Newly-hatched larva pale yellow clothed with long brownish hairs which arch backwards. These are arranged in longitudinal rows. Head light brown, ocelli black. After feeding the larva becomes slightly greenish dorsally and rosy laterally. Length at emergence approximately 2 mm., height approximately 0.5 mm. Duration of instar 6-7 days.

Second instar: Hairs much reduced in length, tapering. Dorsal and lateral surfaces pale olive green. Ventral surface pale yellow, devoid of hairs. Double red-brown dorsal line, greenish between on segments 5-12. Late in this stage spiracles become dark red-brown and a reddish spiracular line is evident on segments 3-9. A prominent black diamond-shaped cervical shield bearing six short setae and eight white tubercles. Head light brown; ocelli black. Duration of instar 5-7 days.

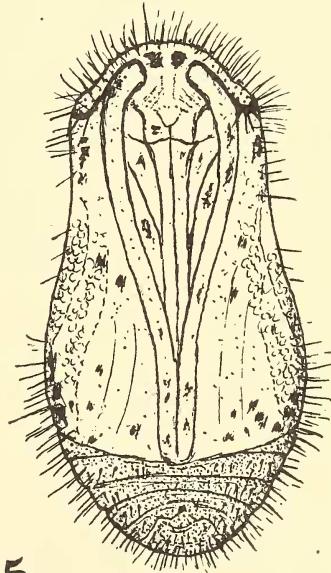
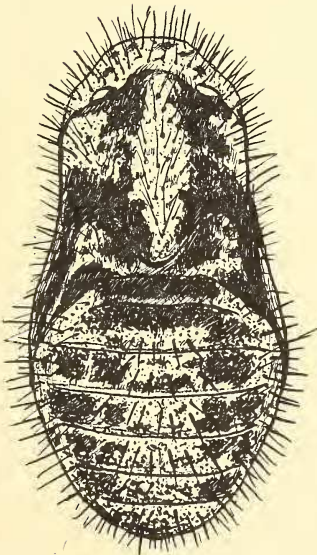
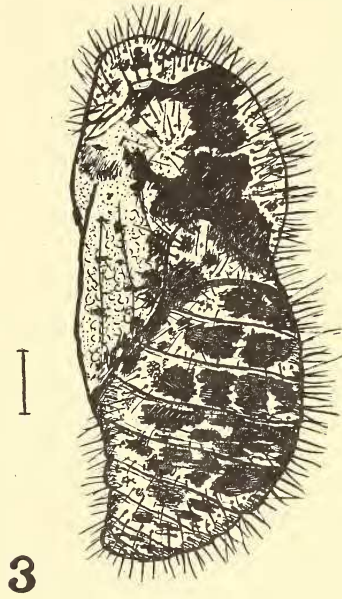
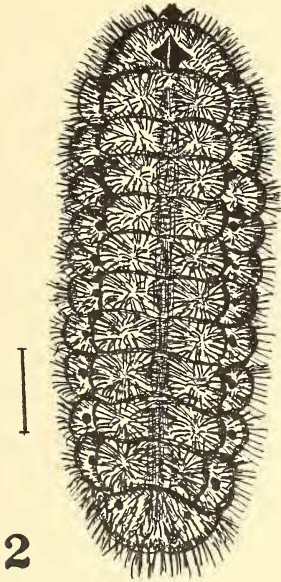
Third instar: Similar to previous, color darker, making for less contrast of dorsal stripes. Spiracles black. Spiracular stripe all but indiscernible. Length 4-5 mm. Duration of instar 7-10 days.

Fourth instar: Much as before, color again slightly darker. Dorsal stripes very faint. More setae, still arranged in groups so that apex of dorsum naked. Length 7-8 mm. Duration of instar 7-9 days.

Fifth instar: Heavy pilous coat, dark brown with hoary tinge caused by generous interspersion of new type of finer and longer hairs wavy at tips. Bluish-green dorsal stripe on all except first thoracic and anal segments. Setae now cover entire dorsum. Head black, spiracles black. Cervical shield even more conspicuous, bisected longitudinally more or less prominently by a faint

EXPLANATION OF PLATE IV

All figures are of *Strymon cecrops* Fabr. FIG. 2. Dorsal view of mature larva. FIGS. 3, 4 & 5. Lateral, dorsal and ventral views of pupa.



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5

line or suture. First thoracic segment now developed into prominent hood. Length 11–13 mm. (Fig. 2). Duration of instar to pupation 10–13 days.

Pupa.

Pale chestnut-brown, becoming darker with age until preparatory to emergence. Dorsal and lateral surfaces mottled with black spots and blotches producing (when fresh) a “contrasty” appearance. Thorax well arched. Covered with short sparse black-brown setae except wing covering and venter. Length approximately 9 mm., breadth 4.5 mm. (Figs. 3, 4, 5).

In conclusion we wish to express our appreciation for suggestions and advice given to us by our genial field companion and co-worker Dr. J. Benjamin Ziegler of Summit, N. J., and our thanks to Mr. Robert Wolf, staff photographer Ciba Pharmaceutical Products Inc., Summit, N. J., for his cooperation in photographing the egg of *S. cecrops*.

LITERATURE CITED

- (1) **Scudder, S. H.** 1889. Butterflies of the Eastern United States and Canada, pp. 1821–3, 3 volumes. Published by the Author. Cambridge, Mass.
- (2) **Edwards, Henry** 1889. Bibliographical Catalogue of the Described Transformations of North American Lepidoptera. Bulletin U. S. National Museum No. 35.
- (3) **Davenport, D. and Dethier, V. G.** 1937. Bibliography of the Described Life-histories of the Rhopalocera of America North of Mexico 1889–1937. Ent. Amer. 17: 155–194.
- (4) **Dethier, V. G.** 1946. Supplement to the Bibliography of the Described Life-histories of the Rhopalocera of America North of Mexico. Psyche, 53: 15–20.
- (5) **Comstock, William Phillips** 1940. Butterflies of New Jersey. Jour. N. Y. Ent. Soc. 48: 47–84.
- (6) **Hessel, Sidney A.** 1948. New Jersey Rhopalocera—*Strymon cecrops* Fabr. Jour. N. Y. Ent. Soc. 56: 243–244. (Erratum: Date in first line should be September 7, 1947.)
- (7) **Remington, C. L.** 1948. The Lepidopterists' News, 2: 76.